

CLAIMS

What is claimed is:

1. An image forming apparatus, comprising:
 - a photoconductive medium which is rotatable and is formed with a predetermined electrostatic latent image thereon;
 - a developing roller to rotate in contact with the photoconductive medium to move and attach a toner to develop the electrostatic latent image on the photoconductive medium;
 - a developing unit frame to support the developing roller to be rotatable, and having a toner receptacle to store the toner;
 - a toner supplying roller to rotate in contact with the developing roller with a predetermined nip with the developing roller to supply the toner stored in the toner receptacle to the developing roller; and
 - a cleaning unit to remove from the toner supplying roller the toner which remains after the toner is transferred from the toner supplying roller to the developing roller.
2. The image forming apparatus of claim 1, wherein the toner supplying roller is formed in a fur brush shape having a cylinder and a fur made of nylon or acryl and attached to the cylinder, and the cleaning unit is formed as a cleaning roller to be supported by the toner receptacle to be in pressing contact with the toner supplying roller with a predetermined pressure to form a predetermined second nip with the toner supplying roller.
3. The image forming apparatus of claim 2, wherein the fur is approximately 5~15 deniers thick and 1.0~1.5mm long.
4. The image forming apparatus of claim 2, wherein the cleaning roller is formed of a strong bar of a cylindrical shape.
5. The image forming apparatus of claim 1, wherein the nip defined between the developing roller and the toner supplying roller is approximately 0.2~0.5mm.
6. The image forming apparatus of claim 5, further comprising:
 - a toner controlling blade to form the toner supplied to the developing roller into a regularly thin film.

7. A developing unit used with an image forming apparatus having a photoconductive medium, comprising:
a toner receptacle to store a toner;
a developing roller to supply the toner to the photoconductive medium;
a toner supplying roller to supply the toner contained in the toner receptacle to the developing roller; and
a cleaning unit to remove the toner from the toner supplying roller.

8. The developing unit of claim 7, wherein the cleaning unit comprises a cleaning roller to shake off the toner remaining on a surface of the toner supplying roller.

9. The developing unit of claim 7, wherein the cleaning unit shakes a portion of the toner supplying roller.

10. The developing unit of claim 7, wherein the cleaning unit is disposed in a direction parallel to a rotation axis of the toner supplying roller.

11. The developing unit of claim 7, wherein the cleaning unit contacts a portion of the toner supplying roller to shakes the portion of the toner supplying roller when the toner supplying roller rotates with respect to the cleaning unit, so that the toner attached to the fur of the toner supplying roller is removed.

12. The developing unit of claim 7, wherein the cleaning unit pushes a portion of the toner supplying roller with respect to the developing roller.

13. The developing unit of claim 7, wherein the cleaning unit pushes the toner supplying roller with respect to the toner receptacle.

14. The developing unit of claim 7, wherein the toner supplying roller comprises a cylinder and a fur attached to the cylinder, and the cleaning unit is disposed to contact the fur of the toner supplying roller and shakes the fur of the toner supplying roller when the toner supplying roller rotates.

15. The developing unit of claim 7, wherein the toner supplying roller comprises a cylinder and a fur attached to a surface of the cylinder in a radial direction of the cylinder by a first distance from the surface of the cylinder, and the cleaning unit is disposed to be spaced-apart from the surface of the cylinder by a second distance.

16. The developing unit of claim 15, wherein the second distance is equal or less than the first distance.

17. The developing unit of claim 16, wherein the cleaning unit comprises a cylindrical member having an outer surface disposed to contact the fur of the toner supplying roller.

18. The developing unit of claim 17, wherein the outer surface of the cylindrical member is spaced-apart from the surface of the cylinder by a third distance which is equal to or less than the first distance.

19. The developing unit of claim 17, wherein the cleaning unit is disposed to contact the fur of the toner supplying roller and shakes the fur when the toner supplying roller rotates, so that the toner attached to the fur is removed.

20. The developing unit of claim 17, wherein the cleaning unit is stationary, and the fur of the toner supplying roller contacts the cleaning unit while rotating together with the cylinder of the toner supplying roller.

21. The developing unit of claim 7, wherein the toner supplying roller is rotatable, and the cleaning unit is stationary.

22. The developing unit of claim 7, wherein the cleaning unit is disposed to contact the toner remaining on a surface of the cleaning unit.

23. An image forming apparatus comprising:
a photoconductive medium; and
a developing unit comprising,

a toner receptacle to store a toner,

a developing roller to supply the toner to the photoconductive medium,

a toner supplying roller to supply to toner contained in the toner receptacle to the developing roller, and
a cleaning unit to remove the toner from the toner supplying roller.

24. A method used with a developing unit of an image forming apparatus having a photoconductive medium, the method comprising:

supplying toner stored in a toner receptacle of the developing unit to a developing roller by using a toner supplying roller disposed within the developing unit; and

removing residual toner remaining on the toner supplying roller with a cleaning unit after the toner supplying operation.

25. A method used with an image forming apparatus, the method comprising:

transferring toner from a toner receptacle of a developing unit to a developing roller with a toner supplying roller to develop a toner image on a photoconductive medium; and
removing the toner remaining on a toner supplying roller with a cleaning unit.